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AUTHOR Hazen, Margaret; Cronenberger, Helen
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ABSTRACT

This paper is an outline of the key points of a presentation on the use of digitized video or videodisks for the development of still graphics instructional materials. An introduction examines the rapid technological changes and trends of the last 10 years and the assumptions underlying this presentation. A discussion of developmental stage issues then considers such criteria as cost, availability, quality or resolution, speed, and reliability. Delivery and revision stage issues are also examined, and a concluding summary provides information on standards, evaluation criteria, and other issues and possible changes. (19 references) (EW)

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ADCIS '88
Digitized Video or Videodisc for Still Graphics

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Margret Hazen, PhD
Director of Instructional Computing
Microcomputing Support Center
CB# 3450, 402 Hanes Hall
University of North Carolina
Chapel Hill, NC 27599-3450
UHazen@TUCC.Bitnet
(919) 962-0101

Helen Cronenberger, PhD
Associate Professor
Dept of Medical Allied Health Professions
Department of Pathology
CB#7120, Division of Medical Technology
School of Medicine
University of North Carolina
Chapel Hill, NC 27599-7120
(919) 966-3874

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Introduction

Rapid technological changes in the last ten years

1978 Apple II
1979 Videodisc university (including MIT) projects; DiscoVision
1980 Apple II Visicalc
1981 IBM PC
1982 Compact Music Disc (Philips-Sony)
1983 IBM PC color CGA monitors
1984 CD ROM (Philips-Sony); EGA monitors (IBM); Macintosh
1985 WORM technology introduced
1986 InfoWindow (IBM) videodisc; Mac Plus; digital videotape
1987 Mac II with color (Apple); HyperCard (Apple); VGA monitors (IBM)
1988 CD drive (Apple); MIT's Media Lab puts movies on CD's; NeXT & erasable CD
1989 CD-I generally available; HDTV introduced; erasable CD's generally available

Trends: 1978-1988

reduced price
greater speed
denser storage
higher resolution

CGA	320 (h) x 200 (v)	16Kb storage at 2 bits per pixel
EGA	640 (h) x 200 (v)	64Kb storage at 4 bits per pixel
VGA	640 (h) x 480 (v)	308Kb storage at 8 bits per pixel
Mac II	640 (h) x 480 (v)	308Kb storage at 8 bits per pixel
Infowindow	640 (h) x 200 (v)	overlay sync
Sony	640 (h) x 400 (v)	overlay sync
TV-NTSC	640 (h) x 480 (v)	922Kb storage at 24 bits per pixel

for all NTSC colors each pixel may need to contain 24 bits of information
giving 16.8 million color choices for each pixel (2^{24}=16,777,216)

Presentation Assumptions

Still graphics are instructionally useful and desirable to incorporate into instructional software when appropriate
Perspectives - computer (digital) versus video (analog)
Perspectives - academic instruction versus industrial/corporate training
Perspectives - in academia, instructional computing is often decentralized to the individual faculty member level
What equipment you purchase depends on how many people are served, i.e., one person, a department, a school or center, or the whole institution
Today's presentation focuses on trends and issues within trends

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Development Stage Issues (analog videodisc vs digital magnetic disk or CD)

What's already available in terms of purchasable images?
- Several generic videodiscs; but may not be the images needed

Cost?
- Analog-videodisc: hardware and software costs -- from $4,000 to $64,000
  - Personnel costs
- Digital-disk or CD: hardware and software costs -- from $1,650 to $32,400
  - Personnel costs

How flexible? Can you revise frequently?
- the need for last minute changes or changes every semester
- the need to have an application grow and evolve over several years
- the need for a variety of types of graphics: line drawing, photographic images, maps
- the need to preserve image quality across changes

What quality or resolution do you require for instruction?
- Do you need color?
  - unlimited color in the analog world
  - for digital images, colors depend on screen resolution and depth of colors
    - 8 bit pixels = palette of 256 (VGA & Mac II)
    - 16 bit pixels = palette of 65,536
    - 24 bit pixels = palette of 16.8 million colors
    - 32 bit pixels = palette of 8.5 billion colors
- Do you need video images at the level of TV or videotape resolution?
- Do you need resolution at the level of very high resolution film slides?
  - (at up to 8,000 line resolution)

How many images would you like to incorporate and how complex are they?
- 100, 1000, 5000, 54000

Speed - how fast does image retrieval have to be?
- CD faster than diskette but not as fast as a hard drive
  - (CD-ROM transfer rate is only 150K per second)

Reliability - how impervious to handling does the storage medium have to be?
- laser discs more reliable than hard drives

What's already available in campus labs for delivery of instruction?
- Which hardware exists in the labs
- Which authoring system has been site licensed
- Do you need to be compatible with networked labs

Delivery Stage Issues

Cost of each station

Fewest components with respect to space

Generic components

Revision Stage Issues

How time consuming & how costly to make changes by a small "team"

Summary

Videodisc as a relatively stable phenomenon except for HDTV

PC Week, June 14, 1988, p 8: "IBM ready for imaging market with optical-storage system," for document retrieval via scanner input.

System integrators are becoming the solution to increase feasibility, because it is easier to apply one technology than an application that involves 5 different ones.

Digitized video is a highly volatile and improving phenomenon

Mac going in the direction of digitizing video

Infoworld , August 29, 1988, p 6: "Investments Provide Clues to Apple's Strategic Goals"

Three areas: multimedia, including professional-quality video, is crucial to the future of personal computing; networking; artificial intelligence.

MacWeek, May 31, 1988, p 1: "Apple's formation of a multimedia group, its commitment to 'true' color and optical-storage systems, and its encouragement of video and animation technology have fueled speculation that future versions of the Mac will have multimedia capabilities built in." Mac II made it possible - HyperCard & CD-ROM are glimpses of the future.

Needs some system integrators

Standards are emerging which will spur more development

Merging of the video and computer professions (analog vs digital)

video professionals adopted computers in the mid to late 70's for editing, special effects, and videodisc

computer professionals adopted video with the Mac II

Slow growth is a possibility

delicate art that requires balancing applications & needs with costs & technology

However, needs are different in different disciplines (fragmented market)

Whether digital on HD or CD, or analog on videodisc is not the real question

since applications drive the market

Videodisc system evaluation considerations:

- Is a healthy variety of off-the-shelf courseware available for the system
  - Is the courseware available from a variety of developers?
- How portable is the system?
- Does it preserve the computer's multi-functionality?
- How many different boards do you need?
- Is it IBM PC AT compatible?
- Does it allow for networking?
- Does the graphics board follow the EGA standard?
- Where are the RGB and video signals mixed -- in the monitor or on a card?
- Does the monitor have multi-sync capabilities?
- Does the board include device driver software?
- How is video synchronization handled?
- Does the system allow toggling?
- Is the system available in (or easily convertible to) PAL?
- Digital video capture capabilites?
- Digital audio capabilites?
- Hybrid storage capabilites?
- Does the authoring system of your choice run on the hardware?
- Can you simulate studio effects?
- If you author on one system, can you play the courses on the other systems?

R. Wolman

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